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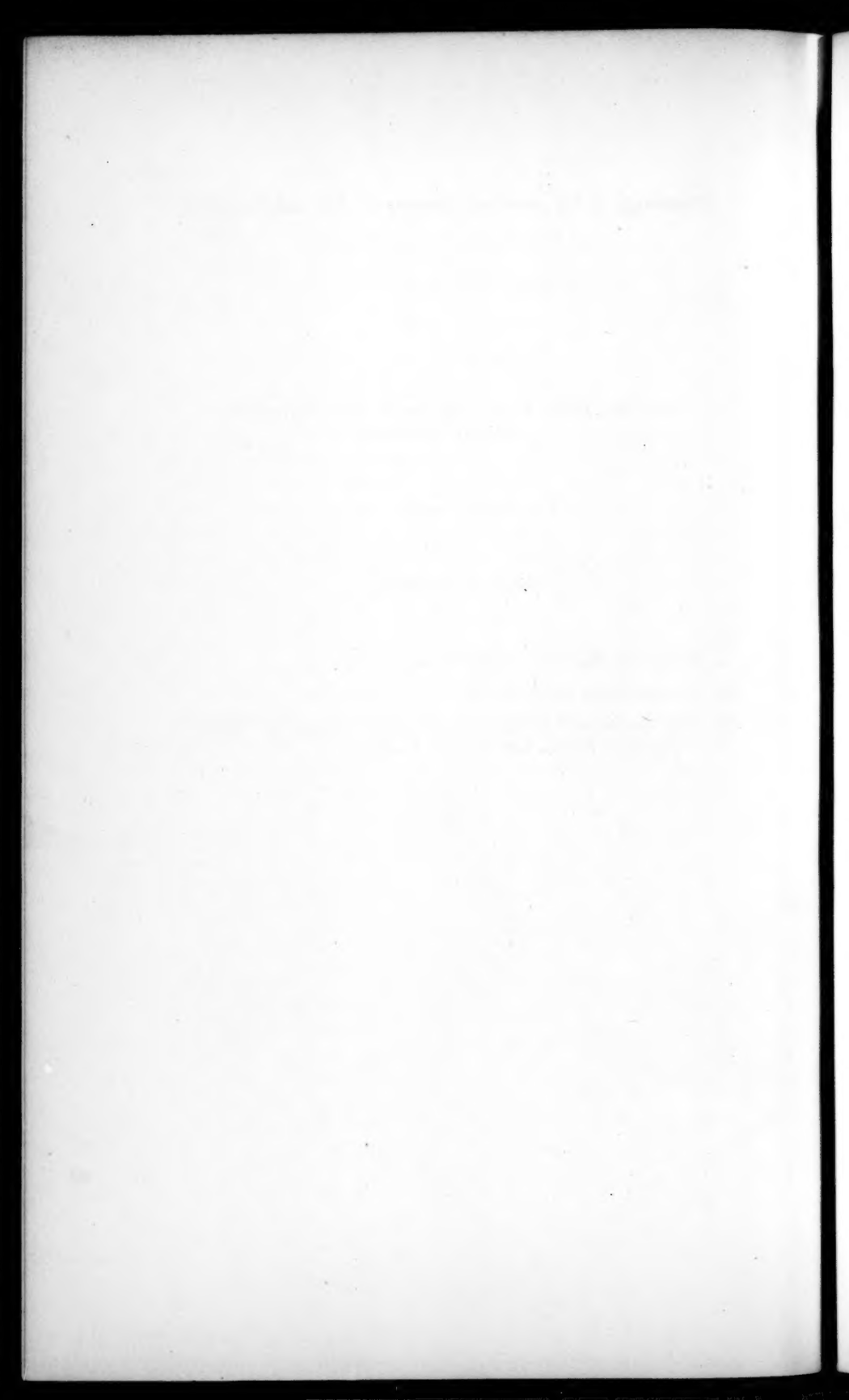
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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY.

NEW SERIES. — No. XX.

By B. L. ROBINSON.

- I. Synopsis of the Genus *Melampodium*.
- II. Synopsis of the Genus *Nocca*.
- III. New Species and newly noted Synonymy among the Spermatophytes of Mexico and Central America.



CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD
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I. — SYNOPSIS OF THE GENUS MELAMPODIUM.

IN the following key to *Melampodium* the genus is limited as by Bentham and Hooker in their *Genera Plantarum* and by Hoffmann in Engler & Prantl's *Natürlichen Pflanzenfamilien*. It will, therefore, be unnecessary here to reproduce the generic description or give generic synonymy. The key is based chiefly upon the material which has accumulated in the Gray Herbarium, including the recently acquired Klatt collection and some borrowed material from the U. S. National Museum. The writer has also in connection with this work been kindly permitted by Mr. Casimir de Candolle to examine and trace the types in the Prodromus Herbarium. Much difficulty has been experienced in giving the species a natural sequence, and after many efforts the hope of securing such an arrangement has been abandoned. The employment of pubescence in grouping the species of this genus is new and appears to yield more satisfactory results than an implicit reliance upon the fructiferous bracts. The latter, as is well known, often surpass the achenes, forming above them a cup or hood. This hood is often pointed dorsally at the summit and the point may be recurved or spirally coiled. Unfortunately, however, these features, the hood and its appendage, show too great variability in certain nearly related forms, such as *M. sericeum* and its varieties, to yield diagnostic characters of the first rank. However, the presence or absence of a hood can usually be determined readily, and the two sections *Eumelampodium* and *Zarabellia* may conveniently be retained.

Bentham and Hooker, l. c., estimated the species at eighteen, and Hoffmann, l. c., accords twenty-five species to the genus. It will be seen, however, that this number can, with our present knowledge, be somewhat increased. The genus reaches its greatest development in Mexico, where, if we include Lower California and Central America, no less than thirty-one species occur. Of these species three reach the southern United States (one merely as an introduction), two are found

in the West Indies, and two or three extend to South America. There are also two species known exclusively from South America. Early in the nineteenth century a species of *Melampodium* (*M. diffusum*) was discovered on the island of Luzon in the Philippines. As the genus is otherwise American, the occurrence of this species in a region so remote has always been problematic, and it has been a matter of no small interest to find the Philippine plant closely matched by specimens recently collected by Dr. Edward Palmer, about Acapulco, Mexico. There can therefore be scarcely a doubt that the genus is in reality of New World origin, and that a single Mexican species was accidentally introduced into the Philippines, where it attracted scientific attention before it was recognized in America. This seems the more likely from the circumstance that Mexico and the Philippines were under the same national control, and early connected by a certain amount of oceanic traffic. This being the case, the transference of seed from Acapulco, the most important Pacific port of Mexico, to the neighborhood of Manila, presents no inherent improbability. The writer is under obligation to M. Robert Buser of the De Candolleian Herbarium for critical comparison, notes, and sketches relative to this and related species.

In this paper the term *fruit* is applied to the ray-achene and the closely enveloping bract.

§ 1. *EUMELAMPODIUM*, DC. Inner (fructiferous) bracts of the involucre exceeding the inclosed achene and developed at the summit into a cup or hood (this obsolete in some forms of *M. sericeum*). — Prodr. v. 518 (1836).

* Lower surface of the leaves sparingly pubescent to hirsute, villous, or tomentose, but not sericeous.

→ South American species: hoods scarcely or not at all appendaged.

↔ Herbaceous annual: rays conspicuous, 6.5 mm. long, unguiculate.

1. *M. PALUDICOLA*, Taubert in Engl. Jahrb. xxi. 455 (1896). — Swamps on the Paranyhyba River, Prov. Goyaz, Brazil, *Ule*, no. 2978. Not seen by the writer.

↔ → Suffrutescent: rays very small, inconspicuous.

2. *M. SUFFRUTICOSUM*, Baker in Mart. Fl. Bras. iv. pt. 3, 162 (1884). On the Esmeralda plains of the upper Orinoco in S. Venezuela. A species omitted from the Index Kewensis. The achenes are crowned by a shallow cup, otherwise the plant would be placed next *M. camphoratum*, to which according to the original description it is presumably related.

→ → Species of Mexico and S. United States.

↔ → Rays short and inconspicuous: appendage of the hood elongated, recurved or coiled: heads usually (but not always) subsessile or short-peduncled.

3. *M. LONGICORNU*, Gray, Mem. Am. Acad. v. 321 (Pl. Thurb.), 1854, where by misprint *longicorne*. — S. Arizona, near Ft. Huachuca, Lemmon, no. 2777; Sonora, Santa Cruz, Thurber, no. 937 (type); Chihuahua, near the city, Pringle, no. 10; San Luis Potosi, Parry & Palmer, no. 443½.

→ → Ligules longer, exceeding the involucre bracts, conspicuous: peduncles mostly long.

= Soft-stemmed, strictly herbaceous and annual.

a. Pubescence short, scanty: leaves oblong to linear, entire: appendage of the hood long: involucre gamophyllous about to the middle.

4. *M. appendiculatum*. Slender, erect, sparingly pubescent annual, 3 to 4 or more dm. high, branched almost from the base: leaves thin, oblong to linear, attenuate at the apex, scarcely narrowed to the sessile subauriculate base: obsoletely serrate to quite entire, the larger ones (near the middle of the stem) 5 cm. long, 1 cm. broad: peduncles 2 to 7 cm. long, erect, slender: involucre saucer-shaped or shallowly cup-shaped, gamophyllous, the limb shallowly 5-lobed; the lobes rounded or barely and very obtusely pointed, their margins scarious: pubescence of the peduncles and involucre short and sparing: rays 8 to 10, oblong, yellow, 6 mm. in length, 2-3-toothed at the apex; fruit tuberculate, the conspicuous appendage a linear coiled awn from an ovate-lanceolate somewhat 2-toothed base: pales scarious. — South-western Chihuahua, Dr. Edward Palmer, no. 245 (collection of 1885). Type in herb. Gray. This species has the outer involucre of *M. cupulatum*, Gray, and the fruit of *M. longicornu*, Gray, yet it is clearly distinct from both, differing from the former not only in its long peduncles and well-developed ligules, but in stature and in the size of the leaves, and from the latter in the presence of a hood and appendage (both totally lacking in *M. cupulatum*) and in the subauriculate base of the leaves.

Var. *leiocarpum*. Similar in all points but the fruit smooth, striate, glandular-punctate, not at all tuberculate. — Collected by Dr. Edward Palmer at Alamos, 16-30 September, 1890, no. 726. Type in herb. Gray.

Var. *sonorense*. Involucre deeper, subcampanulate: fruit slightly roughened: otherwise like the type. — Collected by C. V. Hartman at Cochuto, Sonora, 2 October, 1890, no. 71. Type in herb. Gray.

b. Pubescence short and stiff: leaves lanceolate, undulate: fruit hooded, but the appendage shorter or sometimes obsolete.

5. *M. arenicola*. Decumbent or suberect, branching from near the base; stems dark purple, covered with stiff white somewhat reflexed

hairs: leaves lanceolate from a narrowed auriculate base, undulate to sparingly and irregularly scabrous-pubescent upon both surfaces, 3 to 5 cm. long, 8 to 11 mm. broad: peduncles slender, pubescent, 3 to 7 cm. long; heads often nodding, 1.2 cm. in diameter (including narrow yellow entire or bidentate ligules); involucre shallow, saucer-shaped, the 5 divisions united nearly to the middle, broad, scarious and ciliate at the margin: fruit finely striate, punctate and slightly tuberculate, bearing a well-developed hood surmounted by a slender recurved hispidulous appendage not flanked by lateral teeth at the base. — Collected by F. H. Lamb in sandy soil on Isla Piedra, Mazatlan, Sinaloa, 31 December, 1894, no. 361a. Mr. Lamb's no. 380 also from Mazatlan differs in having no tubercles upon the fruit and in the obsolescent appendage, yet it is probably of the same species. Type in herb. Gray.

c. Pubescence copious, soft, long, villous: leaves ovate-lanceolate to ovate: appendage of the hood short: involucre gamophyllous only near the base.

6. *M. LONGIPILUM*, Robinson. Involucre externally villous, its divisions acutish. — Proc. Am. Acad. xxvii. 173 (1892). — San Luis Potosi, *Pringle*, nos. 3639, 4537.

= = Stems tending toward lignescence: roots at least in part perennial: species of northern Mexico and southern United States.

a. Heads rather small, (including the rays) about 1 to 1.2 cm. in diameter: leaves conspicuously sinuate or pinnatifid: rays thin, short.

7. *M. CINEREUM*, DC. l. c. (1836). Hood muticous. — Laredo, Texas, *Berlandier*, who appears to have confused this with the variety *ramosissimum*, so that his numbers cannot be depended upon.

Var. *RAMOSISSIMUM*, Gray. Hood mucronate. — Syn. Fl. i. pt. 2, 239 (1884), in part. *M. ramosissimum*, DC. Prodr. v. 518 (1836). — Near Laredo, *Berlandier*, S. W. Texas and adjacent Coahuila, *Palmer*, nos. 556, 557, 558 (coll. of 1880).

Var. *ARGOPHYLLUM*, Gray. Hood muticous: leaves small, tomentose upon both surfaces, canescent above, snowy white beneath. — Gray in Wats. Proc. Am. Acad. xviii. 104 (1883 without description). — Coahuila and Nuevo Leon, *Palmer*, no. 2068 (coll. of 1880).

8. *M. LEUCANTHUM*, Torr. & Gray, Fl. ii. 271 (1842). — The commonest form of our southwestern States. Kansas, Hamilton County, *Hitchcock*, no. 250; W. Texas, *Lindheimer*, no. 636, *Reverchon*, no. 1380*, *Thurber*, no. 128, *Heller*, no. 1632, *Pope*, *Bigelow*, *Wislizenus*; New Mexico, *Thurber*, no. 1105, *Wootton*, no. 117; Arizona, *Rothrock*, no. 327, *Palmer*, no. 608, *Pringle*, coll. of 1884; Chihuahua, *Pringle*. This plant has of late been generally regarded as a mere form of

M. cinereum, DC. However, it differs conspicuously in its more entire erect or ascending thickish leaves, its much larger heads (nearly or quite twice as broad) and its long thickish, firm, persistent, and veiny rays. It is a much commoner and more widely distributed plant than *M. cinereum*, and may be conveniently regarded as a specific type.

* * Lower surface of the leaves silky-villous, the pubescence more or less flocculent and tending to be deciduous.

← Ligules shorter than or about equalling the fructiferous bracts: heads sessile or short-peduncled.

9. *M. SERICEUM*, Lag. Hoods tipped by a slender recurved appendage. — "Elench. Hort. Madr. 1805," Gen. et Spec. Nov. 32 (1816); DC. Prodr. v. 518; not HBK. — Mexico, *Mendez*; Oaxaca, *Pringle*, no. 6728; Durango, *Rose*, no. 3476; Jalisco, *Rose*, nos. 2819, 3561; *Esperanza*, *Dugès*.

Var. *exappendiculatum*. Hood destitute of a mucro or appendage, sometimes itself obsolete. — In mountains near Morales, San Luis Potosi, *Schaffner*, no. 271 in part; base of Iron Mountain, Durango, *Dr. E. Palmer*, no. 926 (coll. of 1896); Guanajuato, *Prof. A. Dugès*, *Pringle*, no. 5309; Federal District, *Pringle*, no. 7978 (form approaching *M. hispidum*, HBK).

← ← Ligules conspicuous, usually much exceeding the fructiferous bracts: peduncles long and slender.

↔ Leaves (at least in part) pinnatifid; segments rather broad.

10. *M. AMERICANUM*, L. Spec. ii. 921 (1753); Rel. Houst. 9, t. 21; DC. Prodr. v. 518. — Vera Cruz, Mexico, *Houston*. With this clearly figured plant from Vera Cruz I have been unable to match any specimens from Southeastern Mexico. However, the following specimens from the western coast probably belong here: Manzanillo, *Xantus*, and Colima, *Palmer*, no. 136 (coll. of 1897), and no. 1172 (coll. of 1891).

↔ ↔ Leaves, at least in part, deeply cleft, segments narrow, linear.

= Outer bracts of the involucre pointless, surrounded by a thin yellow somewhat hyaline border.

11. *M. LINEARILOBUM*, DC. Prodr. v. 518 (1836). *M. sericeum*, Benth. in Oerst. Vidensk. Meddel. 1852, p. 86, not Lag. — A well-marked species represented by the following specimens: Oaxaca, *Nelson*, nos. 2809, 2339 (pathological); Chiapas, *Nelson*, no. 2949; Guerrero, hills near Iguala, *Pringle*, no. 9162; Nicaragua, *Oersted*; Sinaloa, *Rose*, no. 3183.

= = Outer bracts of the involucre not membranaceous-margined or colored, herbaceous to the acuminate apex.

12. *M. longipes*. *M. sericeum*, var. *longipes*, Gray, Proc. Am. Acad. xxii. 423 (1887). — Erect, 4 to 5 dm. high, widely branched: upper and

lower leaves entire, lance-linear, acute at both ends, 4 to 5.5 cm. long, 4 to 5 mm. broad, the middle cauline leaves deeply and pinnately 3-cleft into linear acute segments, finely pubescent above, flocculent-sericeous beneath: peduncles filiform, springing from the forks, 2 to 5 cm. long: heads 1.2 to 1.4 cm. broad (including the rather numerous well-exserted narrow bright yellow ligules): fruit tuberculate, the hood well developed and passing gradually and without intermediate toothings into a long slender spirally coiled appendage. — Jalisco, Mexico, on dry hillsides near Tequila, *Dr. Edward Palmer*, no. 391 (coll. of 1886), *C. G. Pringle*, no. 4598. Type in herb. Gray. This plant although in habit identical with *M. heterophyllum*, Lag., is strictly herbaceous and annual. This fact, together with the hooded and appendaged fruit, seems to warrant its separation. It is certainly distinct from *M. sericeum*, Lag.

↔ ↔ ↔ Leaves undivided.

13. *M. KUNTHIANUM*, DC. Prodr. v. 519 (1836). *M. sericeum*, HBK. Nov. Gen. & Spec. iv. 272, t. 398 (1820), not Lag. — Of this species I have seen only a single and imperfect specimen in the De Candolleian Herbarium. The leaves are linear, or nearly so, and entire; the fruit is provided with a well-developed hood but no appendage. This species also exhibits a suspicious resemblance to *M. heterophyllum*, Lag., and it may represent Lagasca's var. *β*.

14. *M. DIFFUSUM*, Cass. Dict. lix. 238 (1829). *M. manillense*, Less. Linnaea, vi. 155 (1831). After examining authentic material of this species in the Prodromus herbarium I can confidently refer to it Dr. Palmer's nos. 3 and 281 from Acapulco, Mexico (coll. of 1895). The species has been hitherto recorded only from the Island of Luzon. As the genus as a whole is American, and as this species is now found to be also an American plant, its occurrence in the Philippines may very likely be due to introduction. At all events it seems from the distribution of the other species more likely that this plant has been carried from Mexico to the Philippines, than the reverse.

Var. *lanceolatum*. *M. lanceolatum*, DC. Prodr. v. 519 (1836). — Fruit with a short hood but no appendage; otherwise closely like the typical form. — Collected by Nee, but the locality unknown. Nee visited both Acapulco, Mexico, and the Philippine Islands.

§ 2. *ZARABELLIA*, DC. Fructiferous bracts not exceeding the enclosed achenes, nor developed into a cup, hood, or appendage at the summit. — Prodr. v. 519 (1836). *Zarabellia*, Cass. Dict. lix. 240.

* Peduncles long and slender: ligules well exserted, conspicuous.

↔ Leaves sericeous beneath.

- ↔ Leaves of diverse forms, partly entire, partly cleft : Mexican.
 = Peduncles long : rays conspicuously exserted : sterile flowers numerous : pales yellow-tipped.

15. *M. HETEROPHYLLUM*, Lag. Gen. et Spec. Nov. 33 (1816) ; DC. l. c. — Tantoyuca, Huasteca, *Berlandier*, nos. 741, 2161, *Ervendberg*, no. 80 ; between San Luis Potosi and Tampico, *Palmer*, no. 1103 (coll. of 1879).

- = = Peduncles short or none : rays 3 to 4, minute : sterile flowers 1 to 3 : pales purple-tipped.

16. *M. Pringlei*. Root perpendicular, long, with fibrous branches, probably annual ; stem copiously branched from the base ; the branches terete, purple, hirsute : leaves chiefly undivided, narrowly elliptic-lanceolate, 2 to 3 cm. long, 3 to 6 mm. broad, acutish, finely subappressed-pubescent above, snowy-sericeous beneath : lower heads short-peduncled from the forks, the upper subsessile, lateral and terminal, all small and few-flowered ; outer bracts of the involucre 5, lance-linear and acute or somewhat spatulate, 3.5 mm. long, so narrow as to disclose the young fruit at an early stage in its development : ray-flowers 3 to 4 ; ligules very small, oval or sub-orbicular, entire or slightly 2-toothed : pales purple tipped ; disk-flowers 1 to 3, mostly reduced to a clavate rudiment : fruit of the ray-flowers obovoid, strongly tuberculate, destitute of hood, cup, or appendage. — Collected by C. G. Pringle, at Las Sedas, Oaxaca, altitude 1,850 m., 15 September, 1894, no. 5722. Type in herb. Gray.

- ↔ ↔ Leaves all undivided, linear : South American.

17. *M. ANGUSTIFOLIUM*, DC. l. c. (1836). — Peru, *Haenke*.

- + + Leaves not sericeous beneath.

- ↔ Slightly lignescent perennial : Lower California.

18. *M. SINUATUM*, Brandegee, Proc. Calif. Acad. Sci. ser. 2, iii. 144 (1891). — San José del Cabo, *Brandegee*, no. 302.

- ↔ ↔ Mexican and S. American species : annuals except *M. montanum*.

- = Leaves cordate- or auriculate-clasping at the base.

19. *M. Rosei*. Erect annual, 3 to 4 dm. high ; stem purplish, copiously branched almost from the base, covered with short white retrorse hairs : leaves oblong-lanceolate, attenuate, sinuately toothed, slightly narrowed to auriculate-clasping somewhat connate bases, sparsely pubescent upon both surfaces, scabrous on the margin, scarcely paler beneath, the larger about 7 cm. long, 2.5 cm. broad : peduncles in the forks of the stem, 7 cm. long, filiform, retrorsely pubescent ; outer involucre 5-parted, the divisions broadly ovate or suborbicular, rounded or barely pointed at the apex, pubescent upon the back : ray-flowers 8 to 10, ligules oblong,

golden yellow, 2-toothed at the tip, about 4 mm. long; fructiferous bracts (without hood or appendage) marked with 3 rows of tubercles upon each lateral surface. — Collected by Dr. J. N. Rose between Rosario and Concepcion, Sinaloa, no. 3271. Type in herb. U. S. Nat. Museum.

Var. *subintegrum*. Leaves clasping at the base but their margins unlobed, obsoletely crenate-serrate. — Collected by Dr. J. N. Rose at Rosario, Sinaloa, 7 July, 1897, no. 1568.

20. *M. mimulifolium*. Dichotomously branched herb; stems purplish-streaked, loosely villous and finely pubescent along a longitudinal line: leaves lanceolate, acuminate, entire or obsoletely serrulate, 5 to 7 cm. long, 1.2 to 2 cm. broad, appressed-pubescent upon both surfaces, somewhat narrowed to an auriculate amplexicaul base: peduncles in the forks of the stem, 4 cm. long, filiform, covered with a fine spreading pubescence: outer involucre 5-parted; segments ovate-lanceolate, acute, somewhat accrescent, appressed-villous: ligules about 8, short-oblong, 2-3-toothed: fruit short, broad, somewhat quadrate, without hood or appendage, compressed, thin, depressed upon the lateral faces, finely tuberculate dorsally. — Collected by E. W. Nelson in the vicinity of Totototpec, Oaxaca, altitude 1700 to 2150 m., 15 July, 1894, no. 740. Type in herb. U. S. Nat. Museum. The foliage recalls that of *Mimulus ringens*.

= = Leaves neither cordate nor auriculate-clasping (except obscurely so in *M. gracile*).

a. Divisions of the outer involucre 3, ovate to ovate-lanceolate, acute or acuminate.

21. *M. PANICULATUM*, Gardn. in Hook. Lond. Jour. Bot. vii. 287 (1848). — Eastern and Central Brazil.

22. *M. GRACILE*, Less. Leaves rhombic, unlobed or panduriform, more or less narrowed to an obscurely auriculate or at least obtuse base. — Linnaea, vi. 407 (1831). — Papantla, *Schiede & Deppe*; Tantoyuca, Huasteca, *Ervendberg*, no. 92; Jalapa, *C. L. Smith*, no. 1605.

23. *M. OBLONGIFOLIUM*, DC. Leaves oblong to oblong-lanceolate, acute to attenuate at the base, never lobed. — Prodr. v. 519 (1836). — Vera Cruz, near Orizaba, *Botteri*, no. 809, *Seaton*, no. 461, Cordova, *Bourgeau*, no. 1628, near Tantoyuca, *Berlandier*, no. 733; Oaxaca, at San Felipe, *Conzatti & González*, no. 560; Michoacan, *Pringle*, no. 4322; Morelos, *Pringle*, no. 7321; Costa Rica, *Pittier*, no. 6963.

b. Divisions of the outer involucre 5, obliquely acuminate.

24. *M. MICROCEPHALUM*, Less. Linnaea, ix. 268 (1834). — This species is known to me only from Lessing's characterization and from an excellent tracing, prepared from the type at Berlin by Mr. J. M. Green-

man. It is evidently close to *M. paludosum* in habit and foliage, differing chiefly, as Lessing himself notes, in its obliquely acuminate instead of rounded or obtuse involucrel bracts.

c. Divisions of the outer involucre obovate, rounded or obtuse.

1. Decumbent perennial with elliptical discolorous leaves and pale yellow rays (often tinged with purple).

25. *M. MONTANUM*, Benth. Pl. Hartw. 64 (1840). *M. Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xxiii. 89 (1887). — Oaxaca, Graham, Pringle, no. 4666; Chiapas, Ghiesbreght, nos. 174, 564; San Luis Potosi, Pringle, no. 3818; Cumbre de Estepa and Yavesia, Liebmann, no. 232.

2. Erect annuals.

26. *M. TENELLUM*, Hook. & Arn. Bot. Beech. 299 (1840). — Acapulco, Sinclair.

27. *M. CUPULATUM*, Gray, Proc. Am. Acad. viii. 291 (1870). — Sonora, Palmer, no. 20; Mazatlan, W. G. Wright, no. 1213; Alamos, Palmer, no. 726 (coll. of 1890). This species may possibly prove identical with the preceding. Both are distinguished from the following by their narrow lance-linear or oblong-linear leaves.

28. *M. PALUDOSUM*, HBK. Nov. Gen. & Spec. iv. 273 (1820). *M. divaricatum*, DC. Prodr. v. 520 (1836). *M. pumilum*, Benth. Pl. Hartw. 64 (1840), described from starved specimens. *M. copiosum* and *M. panamense*, Klatt in Engl. Jahrb. viii. 41, 42 (1887), founded upon trifling foliar variations without accompanying floral distinctions. *Dysodium divaricatum*, Rich. in Pers. Syn. ii. 489 (1807). *D. radiatum*, Desf. Cat. Hort. Paris, 1829, p. 182. *Alcina ovalifolia*, Lag. "Elench. Hort. Madr. 1805," Gen. et Spec. Nov. 32 (1816). *A. ovatifolia*, Jacq. f. Eclog. i. 115, t. 78 (1815?). *A. minor*, Cass. Dict. lix. 243. *Wedelia ovatifolia*, Willd. Suppl. 61 (1813). *W. minor*, Hornem. Hort. Hafn. 855 (1813). — A common weed throughout Mexico, Central America, and also occurring in the West Indies. Highly variable in leaf contour, length of ligules, etc., thus passing into many very diverse yet seemingly unstable forms.

* * Rays short, inconspicuous, exceeded by the involucre: peduncles short or none.

— Leaves ovate-lanceolate, rounded at the subseasile base: Panama to Brazil.

29. *M. CAMPHORATUM* [Benth. & Hook. f. Gen. ii. 349 (1873)], Baker in Mart. Fl. Bras. vi. pt. 3, 161 (1884). *M. digynum*, Benth. & Hook. f. l. c. acc. to Hook. f. & Jacks. Ind. Kew. ii. 188. *Unxia camphorata*, L. f. Suppl. 368 (1781). *U. digyna*, Steetz in Seem. Bot. Herald, 154, t. 30 (1852-1857). — Panama, Seemann, and Llanos de

Cumará, Colombia, *André*, no. 1120, to British Guiana and tropical Brazil, where apparently common.

+ + Leaves narrowed to a petiole or an exauriculate base: stems solitary.

↔ Leaves rhombic to elliptic-oblong, obscurely toothed, undivided.

30. *M. FLACCIDUM*, Benth. Vidensk. Meddel. 1852, 86. *M. tenellum*, var. *flaccidum*, Benth. Bot. Sulph. 115 (1844). — Nicaragua near Granada, *Oersted*; Costa Rica, San Francisco de Guadalupe, *Tonduz*, nos. 7187, 8498; Tepic, Mexico, *Hinds*, *Palmer*, no. 1814 (starved specimens).

↔ + Leaves narrow, linear-oblong and unlobed or deeply cleft into narrowly oblong segments.

31. *M. HISPIDUM*, HBK. Nov. Gen. & Spec. iv. 273, t. 399 (1820). *M. coronopifolium*, Sch. Bip. in Hemsl. Biol. Cent.-Am. Bot. ii. 145 (1881), without character. — Arizona, Apache Pass, and near Ft. Huachuca, *Lemmon*, nos. 331, 2795, Santa Rita Mountains, *Pringle*; Sonora, *Wright*, no. 1205; Chihuahua, *Pringle*, no. 297; Durango, *Palmer*, no. 486 (coll. of 1896); San Luis Potosi, *Parry & Palmer*, no. 444½; Jalisco, *Palmer*, no. 260 (coll. of 1886), in part; Tacubaya, *Bilimek*, no. 593, *Schaffner*, no. 195. — Except in the nature of the pubescence this species closely simulates *M. sericeum*, Lag.

+ + + Leaves obovate, narrowed to an exauriculate base: stems several from the very base.

32. *M. arvense*. Prostrate spreading annual; root fibrous; stems several, 1 to 2 dm. long, more or less branched, purplish, covered all around with short weak white hairs: leaves obovate, entire or obsoletely crenate, rounded at the apex, 3-nerved above the acuminate and slightly connate base, bright green and glabrous or nearly so upon the upper surface, distinctly paler and hispidulous upon the nerves beneath, 1.2 to 2.5 cm. long, 1 to 1.6 cm. broad: heads very small, surrounded by small ovate to orbicular foliaceous bracts and borne close in the forks of the stem and also upon such short lateral cymes as to appear axillary; outer bracts of the involucre 2, ovate, distinct at the base, obtusely pointed: ray flowers 1 to 3, disk flowers about equally numerous: fruits semi-obovate, strongly compressed, reticulated upon the sides, more or less tuberculate dorsally. — Collected by C. G. Pringle in the Valley of Mexico, Federal District, 19 October, 1896, no. 7327 (type, in herb. Gray), and in fields near Toluca, 26 September, 1892, no. 5257, also at an earlier date by Schaffner in mountains near Santa Angela. Nearest *M. bibracteatum*, Wats., but differing markedly in the contour and cuneate base of the leaves as well as in its prostrate several-stemmed habit.

+ + + + Leaves rhombic to oblong, narrowed to a sessile auriculate base.

++ Leaves oblong, relatively narrow.

= Outer involucre bracts 2, not accrescent, or scarcely so.

33. *M. BIBRACTEATUM*, Watson, Proc. Am. Acad. xxvi. 140 (1891).
Fields, Del Rio, State of Mexico, *Pringle*, no. 3230.

= = Outer bracts 4 to 5, obtuse, united at the base into a cup.

34. *M. GLABRUM*, Watson. Proc. Am. Acad. xxvi. 139 (1891). —
Guanajuato in valley near Irapuato, *Pringle*, no. 2821, and Jalisco near
La Barca, *Pringle*, no. 3863.

++ ++ Leaves broad, mostly obovate or rhombic: outer involucre bracts 5, conspicuously accrescent.

= Outer bracts of the involucre lance-oblong, acute, distinct nearly or quite to the base.

35. *M. LONGIFOLIUM*, Cerv. acc. to Cav. Anal. Cien. Nat. vi. 303
(1803). *M. rhomboideum*, DC. Prodr. v. 520 (1836). — San Luis
Potosi, *Parry & Palmer*, no. 444; Valley of Mexico, *Bourgeau*, no.
868, *Pringle*, no. 6455, *Harshberger*, no. 176.

= = Outer bracts of the involucre ovate, obtuse or obtusish, connate toward the base.

36. *M. PERFOLIATUM*, HBK. Nov. Gen. & Spec. iv. 274 (1820). —
A common and well-marked weed throughout Mexico, also established
in S. California at Los Angeles, *Parish Brothers*.

SYNONYMS AND DOUBTFUL OR EXCLUDED SPECIES.

M. achillaeoides, Hemsl. Biol. Cent.-Am. Bot. ii. 145 (1881) = *Vilanova achillaeoides*, Less.

M. australe, Loeßl. It. Hisp. 268 (1758) = *Acanthospermum brasiliense*, Schrank, acc. to Hook. f. & Jacks. Ind. Kew. ii. 188.

M. Baranguillae, Spreng. Syst. iii. 619 (1826) [*M. Baranguillae*, DC. Prodr. v. 521] = *Sclerocarpus africanus*, Jacq., acc. to DC. Prodr. v. 521.

M. Berterianum, Spreng. l. c. An unrecognized and poorly described West Indian plant, very likely not of this genus.

M. brachyglossum, J. D. Smith, Bot. Gaz. xiii. 74 (1888) = *Jaegeria hirta*, Less.

M. copiosum, Klatt in Engl. Jahrb. viii. 41 (1887) = *M. paludosum*, HBK.

M. coronopifolium, Sch. Bip. in Hemsl. l. c. = *M. hispidum*, HBK.

M. digynum, Benth. & Hook. f. Gen. ii. 349 (1873), acc. to Hook. f. & Jacks. l. c. = *M. camphoratum*, Benth. & Hook. f.

M. divaricatum, DC. l. c. = *M. paludosum*, HBK.

- M. Dombeyanum*, DC. l. c. 521, is a still doubtful species from Peru.
- M. Hildalgoa*, DC. l. c. = *Hildalgoa ternata*, Llav. & Lex.
- M. hirsutum*, Benth. & Hook. f. l. c. acc. to Hook. f. & Jacks. l. c. = *M. camphoratum*, Benth. & Hook. f.
- M. humile*, Sw. Prodr. Veg. Ind. Occ. 114 (1788) = *Acanthospermum humile*, DC.
- M. lanceolatum*, DC. Prodr. v. 519 (1836) = *M. diffusum*, var. *lanceolatum*.
- M. Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xxiii. 89 (1887) = *M. montanum*, Benth.
- M. longifolium*, Brouss. ex Willd. Enum. Hort. Berol. 934 (1809) = (?) *M. longifolium*, Cerv.
- M. manillense*, Less. Linnaea, vi. 155, t. 2 (1831) = *M. diffusum*, Cass.
- M. ovatifolium*, Reichenb. Ic. Exot. t. 42 (1827) = *M. paludosum*, HBK.
- M. panamense*, Klatt, l. c. 42 = *M. paludosum*, HBK.
- M. pumilum*, Benth. Pl. Hartw. 64 (1840) = starved *M. paludosum*, HBK.
- M. ramosissimum*, DC. Prodr. v. 518 (1836) = *M. cinereum*, var. *ramosissimum*, Gray.
- M. rhomboideum*, DC. l. c. 520 (1836) = *M. longifolium*, Cerv.
- M. ruderales*, Sw. Fl. Ind. Occ. iii. 1372 (1806) = *Eleutheranthera ovata*, Poit., acc. to Hook. f. & Jacks. l. c.
- M. sericeum*, Benth. in Oerst. Vidensk. Meddel. 1852, p. 86, not Lag. = *M. linearilobum*, DC.
- M. sericeum*, var. *brevipes*, Gray, Proc. Am. Acad. xxii. 423 (1887) = typical *M. sericeum*, Lag.
- M. sericeum*, var. *longipes*, Gray, Proc. Am. Acad. xxii. 423 (1887) = *M. longipes*, Robinson.
- M. ternatum*, DC. acc. to Hook. f. & Jacks. Ind. Kew. ii. 188, = *Hildalgoa ternata*, Llav. & Lex.
- It must be frankly confessed that among the species here kept up the following are to the writer still doubtful:—
- M. americanum*, L., which, although the type of the genus, cannot be matched by any specimen from near the original station.
- M. microcephalum*, Less. Not as yet satisfactorily represented in the herbaria examined.
- M. paludicola*, Taub., the description of which suggests a *Sclerocarpus*.
- M. paniculatum*, Gardn., which from description is not clearly separable from *M. oblongifolium*, DC.

II. — SYNOPSIS OF THE GENUS NOCCA.

NOCCA, Cav. Icon. iii. 12, t. 224 (1795); Pers. Syn. ii. 498 (1807); La Llave & Lex. Nov. Veg. i. 31 (1824); Spach, Hist. x. 40 (1841). *Noccaea*, Willd. Spec. iii. 2393 (1804); Jacq. Frag. 58, t. 85 (1805); Spreng. Anleit. ii. 548 (1818); Less. Linnaea, vi. 695 (1831), & Syn. 151 (1832); not Moench. *Lagasca*, Cav. Ann. Cien. Nat. vi. 331 (1803). *Lagascea*, Willd. Enum. Hort. Berol. 941 (1809); Spreng. l. c. 549 (1818); HBK. Nov. Gen. & Spec. iv. 24 (1820); DC. Prodr. v. 91 (1836); Benth. & Hook. f. Gen. Pl. ii. 342; Hoffmann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 212. — Heads 1- to rarely 2-flowered, aggregated in dense campanulate or subglobose capitate glomerules; these subtended by ovate to linear more or less specialized herbaceous bracts; proper involucre calyx-like, tubular, gamophyllous, 5-toothed. Flowers alike, perfect, fertile. Corolla with narrow proper tube, enlarged cylindric throat, and 5-toothed limb, yellow to white or reddish purple, well exserted from the surrounding involucre. Style-branches long, attenuate; achenes columnar or attenuate toward the base; papus of 2 to several short scales or rudimentary. — Annual herbs or more often shrubs, probably all natives of tropical America, a single annual species now widely distributed in the tropics. Leaves chiefly opposite. The name *Nocca* (given by Cavanilles in 1795 in honor of *Dominico Nocca*, professor of botany at Padua) is clearly the one to be employed for this genus by those who wish to apply consistently the generally conservative Berlin Rules. From the definite characterization and excellent figure given by Cavanilles there can be no doubt as to the identity of his genus *Nocca*, and the fact that the name was taken up in the same sense within fifty years by Persoon, Jacquin, La Llave, and Sweet, should establish its validity. The form *Noccaea*, adopted by various botanists from Cassini to Kuntze, may be regarded as a different spelling of the same name. Although substantive in form it has no advantage over *Nocca* commensurate with the indefiniteness which succeeds any modification of a name as originally published, and it is preferable therefore to take the name in its earliest form. While always reluctant to change any current generic name like *Lagascea*, I hesitate the less in this instance from the fact that this genus has attained no importance in horticulture or pharmacy, and its nomenclature has accordingly little or no significance outside technical systematic botany.

* Involucres 2-flowered.

1. *N. BIFLORA*, O. Kuntze, Rev. Gen. i. 354 (1891), as *Noccaea*. *Lagascea biflora*, Hemsl. Diag. Pl. Nov. 33 (1879), & Biol. Cent.-Am. Bot. ii. 139, t. 44 (1881). — Mexico, without locality, *Parkinson*, Salina Cruz, *C. C. Deam*.

* * Involucres 1-flowered.

+ Shrubs or perennial herbs: Mexican.

→ Flowers large: glomerules sessile or scarcely peduncled, even in age more or less campanulate, the subtending bracts ovate to lanceolate, large and conspicuous: central and southern Mexico.

= Leaves cordate-clasping at the sessile base.

2. *N. HELIANTHIFOLIA*, Cass. Stem pilose: leaves scabrous above, scabro-hirtellous beneath. — Dict. Sci. Nat. xxv. 104 (1822), as *Noccaea*. *Lagascea helianthifolia*, HBK. Nov. Gen. & Spec. iv. 25 (1820). *L. macrophylla*, Zucc. acc. to Steud. Nomen. ed. 2, ii. 4 (1841). *Noccaea macrophylla*, Zucc. acc. to DC. Prodr. v. 92 (1836). Acapulco, Mexico, *Humboldt & Bonpland*; Jalisco, Rio Blanco, *Palmer*, no. 664 (coll. of 1886); Guadalajara, *Pringle*, no. 1824, in part.

Var. *levior*. Stem pulverulent-puberulent, destitute of the long spreading pilosity characteristic of the typical form: leaves scabrous above, scabrous-hirtellous beneath. — Colima, Mexico, *Dr. Edw. Palmer*, no. 1148 (coll. of 1891); Zopelote, Tepic, altitude 615 to 924 m., *Lamb*, no. 561.

Var. *suaveolens*. Stem pilose; leaves soft-pubescent beneath. — *Lagascea suaveolens*, HBK. l. c. (1820). *Noccaea suaveolens*, Cass. l. c. 105 (1822). *Nocca latifolia*, Cerv. in La Llav. & Lex. Nov. Veg. i. 31 (1824). *Lagascea latifolia*, DC. Prodr. v. 92 (1836). — Tamaulipas, Santa Barbara, *Berlandier*, nos. 753, 2173; Guanajuato, *Dugès* (a form resembling the type); Oaxaca, *Nelson*, no. 1804, *L. C. Smith*, no. 964; *Conzatti & González*, no. 558, *Holway*, no. 3724; Puebla, *Conzatti*, no. 861; Vera Cruz, Mirador, *Liebmann*, no. 111; Orizaba, *Schaffner*, *Bourgeau*, no. 3342, *Botteri*, no. 499, *Gray*, Tantoyuca, *Ervendberg*, no. 317; Chiapas, *Ghiesbreght*, nos. 146, 571 (form with leaves exceptionally pubescent almost lanate beneath); Guatemala, *J. D. Smith's* nos. 2410, 4227.

= = Leaves short-petioled, ovate, 2 or 3 times as long as broad: flowers red or purple.

a. Indumentum of the stem spreading, dense, uniform in length, partially glandular: leaves elliptic, obtusish, remotely denticulate.

3. *N. n. sp. [?]*. Branches lignescant, covered throughout by a fine dense spreading pubescence, a part of the hairs glandular, others of

equal length without glandular tip, not rubescent: leaves elliptical-obtusish or very shortly acuminate, grayish-pubescent beneath, somewhat scabrous upon both surfaces, shortly but manifestly petiolate, the upper leaves much reduced, oblanceolate, acuminate, remotely denticulate, much shorter than the rather elongated internodes; secondary nerves 2 or 3, originating some distance above the base: bracts linear, acute, exceeding the flowers. — *Lagascea Moçinniana*, DC. Prodr. v. 92 (1836) as to pl. of Haenke not of Mociño. — Mexico without locality, *Haenke*, in herb. De Candolle. For an excellent sketch of this plant and information concerning it I am indebted to the kindness of Mr. Robert Buser.

b. Indumentum unknown: leaves ovate, acute, green upon both surfaces, finely serrulate with approximate purple-glandular teeth (about 10 to the centimeter).

4. N. MOÇINNIANA, O. Kuntze, l. c. (1891), as *Noccaea Moçinniana*. *Lagascea Moçinniana*, DC. Prodr. v. 92 (1836) as to pl. of Mociño. — Mexico without locality, *Mociño*.

c. Indumentum of the stem widely spreading, composite, consisting of a dense short gray subglandular puberulence and a long white horizontally spreading villosity: leaves ovate, serrate, the margins neither purple nor glandular; both surfaces grayish-pubescent.

5. N. PRINGLEI. Stems slightly lignescent, 1 to 2 m. high, brown, in dried state striate, covered with a fine spreading gray puberulence and long spreading white villosity: leaves ovate, somewhat rigid, 5.5 to 6.5 cm. long, 3 to 4 cm. broad, serrate with about 2 teeth to the centimeter, 3-nerved from much above the base and pinnately veined, gray-tomentose upon both surfaces, especially so beneath, obtuse or acutish at the apex, rounded at the base; petiole 3 to 4 mm. long: branches of the inflorescence rigid, divergent, with long internodes and spatulate bracts; glomerules rather loose, not many-flowered: involucre 1-flowered, cylindrical, upwardly canescent-villous, 1 cm. long, cleft nearly to the middle into 5 erect very unequal teeth: corolla 1.2 cm. long, purple, covered on the outside with a fine gray tomentum; the tube very short, slender; the throat cylindrical, 4 to 5 mm. in length; teeth 5, ovate, scarcely acute: mature achene not seen. — Collected by C. G. Pringle on limestone ledges above Iguala, Guerrero, Mexico, 10 October, 1900, no. 8400. Type in herb. Gray.

d. Indumentum of the stem fine, appressed: leaves elliptic-ovate, finely or more coarsely serrate, but not noticeably purple-glandular on the margin.

1. Leaves green, lucid, and scabrous-pubescent upon both surfaces.

6. N. RIGIDA, Cav. Ic. iii. 12, t. 224 (1795); Sweet, Brit. Fl. Gard. ser. 2, t. 26. *Noccaea rubra*, Cass. l. c. 104 (1822). *Lagascea rubra*, HBK. l. c. 24, t. 311 (1820). — Mexico, Cordillera of Guihilaque,

Berlandier, no. 1018; State of Mexico, *Bourgeau*, no. 1235, *Schaffner*, no. 293, *Pringle*, nos. 3500, 3896, 9098; Cuernavaca, *Bourgeau* no. 1205.

2. Leaves green above, niveous-sericeous beneath.

7. *N. HETEROPAPPUS*, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea heteropappus*, Hemsl. Diag. Pl. Nov. 33 (1879). — Mexico, *Parkinson*, without locality; hillsides near Morelia, Michoacan, *Pringle*, no. 4541.

c. Indumentum of the stem spreading, compound, the short glandular hairs much exceeded by a long non-glandular villosity; leaves ovate-oblong, attenuate, dull and gray-pubescent upon both surfaces, even the upper ones exceeding the internodes.

8. *N. tomentosa*. *Lagascea tomentosa*, Rob. & Greenm. Proc. Am. Acad. xxxii. 43 (1896). — Guerrero, Mexico, between Ayusinapa and Petatlan, *E. W. Nelson*, no. 2121.

= = = Leaves oblong-oblancoolate, 4 to 5 times as long as broad, narrowed at the base to a distinct petiole.

9. *N. ANGUSTIFOLIA*, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea angustifolia*, DC. Prodr. v. 92 (1836). — N. W. Mexico, *Seemann*; Durango, *Palmer*, no. 853 (1896); Jalisco, *Palmer*, no. 643 (1886), *Pringle*, no. 1784.

↔ ↔ Glomerules slender-peduncled, usually raised much above the foliar leaves, at length subglobose, the subtending bracts mostly small and narrow.

= Teeth of the gamophyllous involucre relatively long and narrow, lance-linear to subulate.

a. Involucres soft-villous.

10. *N. DECIPiens*, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea decipiens*, Hemsl. Diag. Pl. Nov. 33 (1879), & Biol. Cent.-Am. Bot. ii. 140, t. 44, f. 1-4 (1881). — North Mexico in the Sierra Madre, *Seemann*, no. 2056; Southwestern Chihuahua, *Palmer*, no. 145 (coll. of 1885); Sonora, at Guaymas, *Palmer*, no. 256 (coll. of 1887), Alamos, *Palmer*, no. 401 (1890), La Tinaya, *Hartmann*, no. 249.

b. Involucre hirsute.

11. *N. glandulosa*. *Lagascea glandulosa*, Fernald, Bot. Gaz. xx. 534 (1895). — W. Mexico, head of Mazatlan River, *W. G. Wright*, no. 1305; Rosario, Sinaloa, *Lamb*, no. 483.

= = Teeth of the involucre very short (1 to 1½ mm. in length), ovate to deltoid-lanceolate.

a. Stem and floral branches pubescent to tomentulose.

12. *N. Liebmannii*. *Lagascea Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xx. 91 (1884). — Leaves soft-pubescent beneath: involucre

finely villous, 6 to 7 mm. long: corolla 7 mm. long, puberulent, the teeth ovate. — Pochutla, Oaxaca, *Liebmann*, no. 250 (type in herb. Bot. Gard. Copenhagen; fragment and good sketch in herb. Gray).

b. Stem and floral branches glabrous.

13. *N. Palmeri*. Slender-stemmed shrub, with terete divaricate glabrous branches; internodes long, in dried state finely ribbed: leaves ovate, acute, scabrous both above and beneath with enlarged and indurated bases of trichomes (in the manner of many *Borraginaceae*), nearly or quite entire, 1.5 to 2.5 cm. long, abruptly narrowed at the base to a very short petiole: floral branches opposite; peduncles slender, 2 to 4 cm. long; glomerules 2.5 cm. in diameter, subglobose, about 25-headed; subtending bracts ovate-oblong to narrowly oblong, 6 to 8 mm. in length, their pubescence similar to that of the leaves; involucre terete, 10-nerved, 1 cm. long, sparingly villous; segments deltoid-lanceolate, minutely ciliated: corolla 1 cm. long, essentially glabrous; its teeth elliptic-oblong, 3 mm. in length, 2-nerved: pappus a finely fringed campanulate cup. — Collected by Dr. Edward Palmer, at Colima, Mexico, 27 to 28 February, 1891, no. 1320.

+ + Annual: tropics of both hemispheres.

14. *N. mollis*, Jacq. Frag. 58, t. 85 (1809). *Lagasca mollis*, Cav. Ann. Cien. Nat. vi. 333, t. 44 (1803). *Noccae mollis*, Cass. l. c. 103 (1822). *Lagascea Kunthiana campestris*, Gard. in Hook. Lond. Journ. Bot. v. 238 (1846). *Lagasca parvifolia*, Klatt, Ann. k. k. Nat. Hofmus. Wien, ix. 360 (1894). — Western and southern Mexico, tropical South America, West Indies, also Bengal, etc.

III. — NEW SPECIES AND NEWLY NOTED SYNONYMY AMONG THE SPERMATOPHYTES OF MEXICO AND CENTRAL AMERICA.

Dioscorea platycolpota, E. B. Uline in litt. "Glabrous throughout; stem stout, dextrorsely twisted; leaves membranaceous, orbicular-cordate, 9 to 11-nerved; ♂ racemes short, solitary, densely flower-bearing nearly to the base; flowers pedicellate, disposed in 3 to 5-flowered cymules, which in turn are closely arranged on the pendant rachis; perianth greenish yellow, campanulate, equalling or surpassing the slender pedicel; stamens three, rising divaricately from the somewhat fleshy receptacle, a little shorter than the ovate segments of the perianth; anthers extrorse. Pistillate spikes short, solitary; perianth very shortly stipitate; style

column slender, its slender, divaricate branches bifurcate at the apex; capsules small and crowded, obovate, leathery in texture; seed small, corrugated, with peripheral wing. — Collected by C. G. Pringle on limestone mountains near Iguala, State of Guerrero, Mexico, altitude 1,230 m., 15 September, 1900, no. 9224. This plant exhibits close affinities for *D. Pringlei*, Rob., the essential floral characters being identical; but the striking difference displayed in its much larger and densely crowded flowers serves to give it an entirely distinct aspect, and seems to justify a specific description. Leaves 8 to 9 cm. in diameter. Racemes 12 cm. long, with rather stout rachis. Perianth 5 mm. wide; segments 4 mm. long. Capsules 7 to 8 mm. wide."

Calochortus Pringlei. Bulb ovoid, 3.5 cm. long, covered by more or less thickened somewhat reticulated fibres, and surmounted by a cylindrical mass of long linear fuscous scales, from the midst of which rises the stem; this 4 dm. high, terete, glabrous, simple or branched, 3-5-leaved: leaves flat, linear, attenuate, the basal 3 dm. long, the cauline gradually shorter; bracts of the spathe 2, opposite, subequal, 2 to 3 cm. long, lanceolate, acuminate; pedicels glabrous, 2 to 7 cm. long; flowers 3 cm. in diameter, dark purple or almost black; sepals narrowly obovate, bluntly pointed or retuse, glabrous except at a small roundish area a little below the middle on the inner surface: petals broadly obovate, cuneate, 1.4 cm. long, two-thirds as broad, obtusely pointed, externally glabrous, internally covered on all parts except the narrowed base by rather coarse violet or yellow hairs: filaments 5 lines long, glabrous; anthers 3.5 lines long, apiculate: ovary glabrous; capsule acute at each end, 2.5 cm. long, 8 mm. in diameter. — Collected by C. G. Pringle in thin soil of the top of knobs of the Sierra de Tepoxtlán, State of Morelos, Mexico, altitude 2,300 m., 15 September, 1900, no. 8435. Type in herb. Gray. Evidently related to *C. flavus*, Schultes, f. but differing in its dark colored flowers, short and broad fruit, etc.

MIMOSA ACANTHOCARPA, Benth., var. *desmanthocarpa*. Habit, foliage, and thorns of the typical form: pods unarmed, the valves minutely fulvous-tomentose. — Collected by E. W. Nelson between San Cristobal and Teopisca, Chiapas, Mexico, altitude 2,060 to 2,620 m., 4 December, 1895, no. 3428. Type in herb. U. S. Nat. Museum; fragment in herb. Gray.

Mimosa eurycarpoides. Branches glabrous, soft-woody, with rather large pith, terete or subangular, armed by a few small scattered spines: leaves large, (including the petiole) 1.2 to 2 dm. long; pinnae 7 to 12 pairs, 3.5 to 5 cm. long, puberulent upon the rachis; leaflets 20

to 30 pairs linear-oblong, 5 to 8 mm. long, 1.6 mm. wide, acutish, oblique at the base, finely appressed-pubescent upon both sides: flowers capitate, heads globose, 1.3 cm. in diameter; peduncles filiform, 1.5 cm. long, borne by twos and threes in the axils of the upper leaves: calyx turbinate-campanulate, scarious, slightly cuspidate-toothed, 0.8 mm. long: corolla 2.3 mm. long, glabrous, not conspicuously ribbed: stamens 8 or 10: pod 4.5 cm. long, 1.2 cm. broad, unarmed, glabrous, dark colored, oblanceolate, acute, thickish; valves not segmented. — Collected by Dr. J. N. Rose in the foothills of the Sierra Madre, near Colomas, State of Sinaloa, Mexico, 21 July, 1897, no. 1805. Type in herb. U. S. Nat. Museum; fragment in herb. Gray. To this species I should refer also Dr. Rose's no. 3157, collected on a road between Acaponeta and Rosario. While it is more copiously armed it shares all important characteristics with the plant from Colomas. The species is readily distinguished by its smooth unjointed fruit and axillary inflorescence.

Mimosa ionema. Shrub or small tree 3 to 5 m. high; branches unarmed, terete or nearly so, puberulent; branchlets green, angled and costate, tomentulose: stipules filiform, 8 mm. long, tomentulose under a lens; petioles angled, straight, puberulent-tomentulose, 4 to 6 cm. long, equalled by the foliar rachis; pinnae 4 to 6 subremote pairs, 5 cm. long, the lower ones commonly alternate; stipels 1 mm. long; leaflets about 15 pairs, oblong, obtuse, green and nearly or quite glabrous upon both surfaces, slightly paler beneath, oblique at the base, excentrically 1-nerved, pinnately veined, 1 cm. long, 3 to 4 mm. broad: flowers loosely spicate, spreading or somewhat deflexed; spikes fascicled by 3's and 4's in the axils of the upper leaves, ascending, 6 cm. long, on penduncles 2 to 3 cm. in length: corolla white or pale yellow, 2.5 mm. long, cleft to below the middle, without conspicuous nerves or ribs, glabrous; segments 4 to 5, lance-oblong, acutish: stamens 8 to 10; filaments violet-tinged: fruit (immature) narrowly oblong, acute at both ends, thin, glabrous, 5 cm. long, 7 mm. broad, about 8-seeded. — Collected by C. G. Pringle in the valley below Cuernavaca, Mexico, altitude 1,230 m., 17 October, 1900, no. 8377. Type in herb. Gray.

Mimosa Watsoni. Fruticose and probably scandent: stems subterete, tomentulose chiefly along six longitudinal lines, these bearing minute approximate subequal very short recurved spines: branchlets grayish-tomentose: petioles (including the rachis) 5 cm. long, rigid, angled, armed laterally and ventrally by 2 or 3 lines of recurved spines, tomentulose especially along the armed angles; pinnae 2 pairs; the lower bearing 1 or 2 pairs of leaflets, the upper with 2 or 3 pairs;

leaflets rhombic-ovate or obovate, lucid and finely pubescent above, tomentulose beneath, destitute of setae and ciliation, pinnately veined; the lateral 1.5 to 2.5 cm. long, subsymmetrical, the terminal twice as large, oblique and with excentric midnerve: globular heads (7 mm. in diameter) white, racemosely disposed on the long spreading unarmed grayish tomentose branches of a loose panicle; pedicels slender, 1 cm. long: corolla 4-parted to the middle, its lobes short-oblong, rounded at the apex: stamens 8: pods 5 cm. long, 7 to 10 mm. broad, glabrous and lucid upon the disarticulating valves but finely papillose under a strong lens, dark brown, unarmed except for a few scattered minute recurved spines upon the tomentulose replum; rectangular segments thin, broader than long. — Collected by the late Dr. Sereno Watson in the eastern portions of Vera Paz and Chiquimula, Guatemala, in 1885, nos. 323 in fruit and 185 in flower. Types in herb. Gray. This species of the subgenus *Habbasia* is closely related to the South American *M. Spruceana*, Benth. From this it differs, however, in the much less dense and less rufescent pubescence of the stem, more strongly armed petioles, less numerous leaflets of different venation and finally in its much smaller fruit, which is at full maturity less than half as broad as in the Brazilian plant.

Russelia Deamii. Stems becoming 1.6 m. long, 4-angled below, 6-angled toward the ends, copiously branched, glabrous except on the smaller branchlets, with slender ribs at the angles: leaves 1.5 to 2 cm. long, two thirds as wide, ovate, acute, incisely serrate except near the cuneate base, green, loosely pubescent and sparingly punctate above, slightly paler and strongly white-villous beneath especially about the larger nerves and near the base: cymes numerous, 3-flowered; peduncles slender, 4 mm. long, pubescent as are also the filiform slightly longer pedicels; bractlets linear: lobes of the villous calyx lance-acuminate from an ovate base: corolla scarlet, 1.6 to 2 cm. long, the nearly equal lobes suborbicular: fruit not seen. — Collected at Cuernavaca, Mexico, 7 July, 1900, by Charles C. Deam, no. 30. This species differs from *R. sarmentosa*, Jacq., in its villous more incisely toothed leaves and 6-angled branches, from *R. jaliscensis*, Rob., in the form of its calyx-lobes, from *R. polyedra*, Zucc., in its larger flowers and glabrous less strongly ribbed stems as well as in the form and sharp dentation of the leaves.

Russelia trachypleura. Stems 6-angled; angles prominent, rib-like, pale, roughened by small scattered callosities; areas between the ribs flat, green, glabrous or (especially near the nodes) somewhat hairy; branches usually 4-angled: leaves ternate on the stem, opposite on the

branches, elliptic-ovate, acute or acutish at each end, short-petioled, sharply serrate, green, resinous-dotted, and pubescent on the upper surface, slightly paler and pubescent upon the pinnately arranged veins beneath: flowers in short few-flowered axillary cymes: calyx-lobes ovate, caudate-acuminate, externally pubescent toward the sharp tip, 4 mm. long: corolla bright scarlet, 1.2 cm. long, with cylindrical tube and 4 short rounded subequal lobes, the upper one broader and emarginate. — Collected by C. G. Pringle on the Sierra de Tepoxtlán, State of Morelos, Mexico, altitude 2,300 m., 11 September, 1900, no. 9445. Readily distinguished from all the other species by the callosities on the rib-like angles of its stems.

Piqueria pyramidalis. Stem terete, 2 to 2.5 m. high, puberulent, green but maculate with elongated dark brown or purplish dots: leaves alternate (at least the upper ones), petiolate, broadly ovate, shallowly about 7-lobed, coarsely crenate, 3-nerved from the rounded to strongly cordate base, green and scabrous-puberulent above, paler and tomentulose beneath, the larger 1.7 dm. long and about as broad; petioles subterete, tomentulose: small and very numerous heads in pedicellate racemose glomerules; these forming a large leafy-bracted pyramidal panicle: involucre scales oblong, green, about 2-seriate, 2.5 to 3 mm. long, puberulent and covered with minute amber-colored particles upon the outer surface: corolla white, 3 mm. long, with short proper tube and relatively large throat, also bearing a few amber-colored particles: styles much exserted, clavate, purplish or brown; achenes dark-colored, glabrous, lucid, 2.5 mm. long. — Collected by C. G. Pringle in shade of cliffs on mountains above Iguala, altitude 1,230 m., 10 October, 1900, no. 8389. Type in herb. Gray. This species, although possessing all the technical characters of the genus, differs considerably in habit from the other Mexican species, being in fact nearer some of the South American.

Ageratum lucidum. Shrub with buff cortex and opposite spreading curved-ascending terete finely striate glandular-puberulent branches: leaves opposite, ovate, acutish, serrate from below the middle, thin, veiny, glabrous or early and completely glabrate upon both surfaces and lucid especially above, 4 cm. long, half as broad, ciliolate upon the margin, 3-nerved from somewhat above the abruptly acuminate shortly petiolate base, minutely white-dotted beneath and also covered with globular resinous or glandular atoms: corymbs long-peduncled (often irregularly compound), 2-6-headed and subtended by reduced opposite lance-oblong to linear sessile bracts; pedicels 1 to 2.4 cm. long, curved-ascending, 1-headed with or without 1 or more filiform bractlets; heads campanu-

late, 70-100-flowered, nearly 1 cm. in diameter; outer involucre scales linear-filiform, ciliated, the inner lance-oblong, acuminate, rigidulous, the subscarios margins erose: achenes black, 2 lines long, sharply angled, glabrous, very finely and transversely striate; pappus a shallow un-toothed cup without awns. — Collected by C. G. Pringle, on mossy sides of conglomerate knobs of the Sierra de Tepoxtlán, near Cuernavaca, State of Morelos, Mexico, altitude 2,310 m., 31 October, 1900, no. 8362, and previously 15 March, 1899, no. 7851. Well marked. Type in herb. Gray.

***Ageratum rhytidophyllum*.** Shrub with opposite terete dark red branches covered with a fine crisped cinereous puberulence: leaves opposite, subsessile, lance-oblong, 4 to 7 cm. long, 1.2 to 2 cm. broad, entire or obscurely serrate, revolute at the margin, acute at both ends, thickish, grayish green, scabrous-pubescent and strongly rugose above; veins much reticulated and prominulous beneath where covered by a dense spreading white pubescence; interstices covered by aureous particles: inflorescence of compound corymbs terminal upon the branches; bracts linear; heads rather small, 5 mm. in diameter, nodding on short glandular-puberulent pedicels, about 25-flowered; involucre scales unequal, pluriseriate, lance-linear, acute, pungent, green, striate, finely and sparingly pubescent; pales similar but narrower, rather rigid: corolla 3 mm. long, glabrous but covered with aureous particles; the proper tube greenish, about equalling the combined length of the whitish throat and lavender colored limb: achenes glabrous; pappus a short obscurely toothed cup. — Collected by C. G. Pringle on the Sierra de San Felipe, Oaxaca, Mexico, altitude 2,150 m., 5 October, 1894, no. 5675. Type in herb. Gray. Also secured in an immature state somewhat earlier (20 September, 1894) in the valley of Oaxaca by E. W. Nelson, no. 1446, and a little later (4 November, 1894) in the mountains of San Juan del Estado by Rev. L. C. Smith, no. 277.

***Ageratum stachyofolium*.** Erect perennial with long tough filiform white roots; stem 5 to 6 dm. tall, terete, finely striate, purplish, densely covered with fine crisped white hairs: leaves elliptical, sessile or nearly so, mostly alternate, crenate, obtuse, pubescent upon both surfaces, 3-nerved, deep green above, paler green and veiny beneath, 3 cm. long, half as broad: corymbs terminal, simple, regular, 7-10-headed; bractlets filiform-spatulate; pedicels 2 to 2.5 cm. long, canescent-tomentulose; heads large for the genus, 1.2 cm. in diameter, about 100-flowered; scales of the involucre linear, acute, strongly striate, hirsute: achenes glabrous, sharply angled, dark brown, somewhat tapering toward

the base, 2 mm. long; pappus a short scarious untoothed cup without awns. — Collected by E. W. Nelson in the vicinity of La Parada, Oaxaca, altitude 2,310 to 2,620 m., 19 August, 1894, no. 991. Types in herb. Gray and herb. U. S. Nat. Museum.

Eupatorium anisopodum. Herbaceous perennial: stems terete, decumbent, flexuous, irregularly branched, puberulent especially near the nodes and under a strong lens, green or purplish tinged, 3 to 5 dm. high: leaves ovate or rhombic-ovate, opposite, 2 to 2.5 cm. long, 1.2 to 1.7 cm. broad, thickish, not punctate, crenate-serrate from the broadest portion to the acutish apex, covered above with fine short curved hairs, slightly paler beneath and appressed-pubescent upon the veins, 3-5-nerved, sub-cuneate at the base to a short petiole (5 mm. in length): bracts ovate-lanceolate, acute, 3 to 7 mm. long, the lower petiolate the upper sessile; heads small, 25-30-flowered, 5 to 7 mm. in diameter, not numerous, irregularly corymbose on pedicels of very unequal length; scales of the turbinate-campanulate involucre pluriseriate, very unequal, the outer short, ovate, acuminate, herbaceous, pubescent; the inner oblong, acute, pale, 2-3-nerved, ciliolate, sparingly pubescent or glabrous: corolla 2.2 mm. long, probably white, glabrous except at the limb where under a strong lens puberulent, the proper tube short, considerably exceeded by the subcylindric scarcely ampliate throat: achenes columnar, at length black, hispidulous on and between the five nerve-like angles, 1.5 mm. long; pappus-bristles 15 to 20, bright white, about equalling the corolla. — *E. pycnocephalum*, Coult. in J. Donnell Smith, Enum. Pl. Guat. ii. 94 (1891), not Less. — Collected by H. von Türkheim at Santa Rosa, Department Baja Vera Paz, Guatemala, altitude 1,540 m., April, 1887, no. 1177 of Mr. J. Donnell Smith's Guatemalan set. Type in herb. Gray. While possessing something the habit of *E. pycnocephalum*, Less., this plant is readily distinguished by its very different pluriseriate involucre.

EUPATORIUM ARALIAEFOLIUM, Less. Linnaea, vi. 403 (1831). Add syn. *E. heterolepis*, Robinson, Prœc. Am. Acad. xxxv. 335 (1900).

EUPATORIUM BIGELOVII, Gray, Bot. Mex. Bound. 75 (1859). Add syn. *E. madreense*, Wats. Proc. Am. Acad. xxvi. 137 (1891).

EUPATORIUM CONSPICUUM, Kunth & Bouché, Ind. Sem. Hort. Berol. 1847, p. 13. Of this, *E. grandifolium*, Regel, Gartenflora, i. 102, t. 12 (1852), is certainly a synonym.

Eupatorium Coulteri. Stem slender, straight, terete, densely fuscous-puberulent: leaves opposite, deltoid-ovate, acute or subcaudate, somewhat hastate-lobed at the almost truncate base, shallowly dentate,

thin, harsh and slightly scabrous upon both surfaces, 4 to 5 cm. long, half as broad, minutely punctate, slightly pubescent upon the nerves; slender fuscous-pubescent petioles 1 cm. long: heads in rounded axillary and terminal thyrsoid panicles; pedicels filiform, flexuous, covered with fine spreading purple pubescence; bracts and bractlets subulate, minute; involucre turbinate, the lower much reduced scales somewhat decurrent upon the pedicels, the inner scales oblanceolate-oblong, acuminate, erose, puberulent or granular dorsally, thin, striate, often purplish-tinged; flowers about 8: corolla tubular, slightly and gradually narrowed from the summit to the base, essentially glabrous, slightly exceeding the barbellate pappus: achenes dark-colored, upwardly hispid upon the prominent angles. — *E. ageratifolium*, var. *purpureum*, Coulter, Bot. Gaz. xvi. 98 (1891). — Collected by H. von Türkheim in Coban, Depart. Alta Vera Paz, Guatemala, altitude 1,415 m., March, 1887, no. 52 of Mr. John Donnell Smith's sets. This plant differs from *E. ageratifolium*, DC., so greatly in pubescence, leaf-texture, involucre, and inflorescence that intergradation does not appear likely.

EUPATORIUM DASYCARPUM, Gray, Proc. Am. Acad. xxii. 420 (1886). Add syn. *Stevia rapunculoides*, DC. Prodr. v. 124 (1836).

Eupatorium dryophilum. Perennial from a thickish branched caudex; stems several, erect, 5 to 7 dm. high, terete, finely striate, puberulent or tomentulose, slightly scabrous, not glandular, reddish brown, branched at the summit: leaves opposite or ternate, sessile, ovate or oval, the lowest obtuse, the upper acute, all 3-nerved, shallowly few-toothed, thickish, reticulate-veiny, very scabrous upon both surfaces, entirely destitute of glands or resinous particles: heads large, 1.4 cm. in diameter, slender-pedicelled, erect; involucreal scales thin, green, oval to oblong, rounded at the apex, 4-5-seriate, striate, glabrous, mealy not viscid: corollas purple, glabrous except at the short-toothed limb: pappus-bristles sordid, barbellate, very unequal; achenes dark olive, 4 mm. long, granular. — Collected by Dr. Edward Palmer, on the Rio Blanco, Jalisco, October, 1886, no. 651, and by C. G. Pringle with oaks and pines on rocky hills near Guadalajara, nos. 2171, 2323. This species is near *E. pleianthum*, Robinson, but differs from it in the absence of resinous globules upon the leaves and the presence of mealiness upon the involucre which is not viscid, also in its shorter darker achenes with fine transverse striation.

EUPATORIUM HYSSOPINUM, Gray, Proc. Am. Acad. xv. 28 (1880). Add syn. *E. koelliaefolium*, Greene, Pittonia, iii. 31 (1896). Identity exact.

EUPATORIUM LEMMONI, Robinson, Proc. Am. Acad. xxvii. 171 (1892). Add syn. *E. euonymifolium*, Greene, Pittonia, iii. 31 (1896), founded upon a co-type.

Eupatorium Gonzalezii. Apparently herbaceous and to the unassisted vision glabrous throughout; stems terete, green, finely striate, lucid, purple at the nodes, slender; the younger parts microscopically puberulent: leaves opposite, long-petioled, deltoid-ovate, obtuse, coarsely crenate-dentate, 3-nerved from the entire abruptly acuminate base, thin, bright green and glabrous upon both surfaces, 4.5 to 7 cm. long, 4 to 4.5 cm. broad; petioles slender, 3 cm. long; the uppermost leaves ovate-lanceolate, entire, shorter-petioled: heads numerous, about 18-flowered, small, in compound axillary and terminal cymes; peduncles and pedicels ascending, obscurely puberulent; bracts spatulate and mucronate to linear and acute, small; involucre scales green, striate, narrow, linear, obtuse at the scarious erose and often crumpled apex, a few of the outer considerably shorter, ovate, acuminate, ciliate: corollas white, glabrous throughout, the greenish white proper tube somewhat exceeded by the pure white throat and spreading limb: achene dark, 1.3 mm. long, upwardly hispid on the angles; pappus pure white, sparse; the bristles essentially equal, nearly as long as the corolla, slightly connate into a minute cup at the base. — Collected by Professors C. Conzatti and V. González at El Fortín, Oaxaca, altitude 1,600 m., March, 1897, no. 387.

Eupatorium leonense. Stem 4 mm. in diameter, slightly lignescent, pithy, yellowish brown, glabrate; branches opposite, curved-ascending, striate, tomentulose, finely pubescent: leaves opposite, ovate to deltoid-ovate, long-petioled, thin, coarsely and rather bluntly few-toothed, acutish, abruptly contracted at the entire base to an acuminate attachment to the long petiole, finely pubescent when young, nearly or quite glabrate at maturity, 3 to 5 cm. long, nearly as broad, 3-nerved from a little above the base; petioles 3 to 4 cm. long, pubescent: pedicels slender, flexuous, green, puberulent; bracts minute, subulate; heads rather few in a small round-topped panicle, medium-sized, 8 mm. long, about 12-flowered; involucre, campanulate, loosely imbricated, lance-linear, attenuate, very acute, green, striate, thin, sparingly white-pubescent, the outer much shorter: corolla narrowly cylindrical, of essentially uniform diameter throughout its length and without clearly marked throat or proper tube, glabrous: style-branches strongly clavate, yellow; achenes black, glabrous, lucid, 2 mm. long with conspicuous yellow callosity at the base; pappus white, equalling the corolla. — Collected by

C. G. Pringle on the Sierra Madre near Monterey, Nuevo Leon, Mexico, 16 June, 1887, no. 2277.

Eupatorium Liebmannii, Sch. Bip. in Klatt, Leopoldina, xx. 75 (1884). From the characters given and from an excellent drawing (in herb. Klatt) prepared from the original material I cannot avoid the conclusion that this is identical with the earlier *E. hirsutum*, DC., the type of which I have recently examined in the Prodromus Herbarium. The species is represented by Mr. Pringle's no. 6046 from the foothills of the Sierra de San Felipe, Oaxaca.

Eupatorium longifolium. Suffrutescent, 1 m. high: stems virgate, terete, finely striate, covered by a fine spreading purplish and probably viscid pubescence: leaves opposite, short-petioled, ovate-lanceolate, crenate-serrate, 3-nerved, thin, dark green and strigillose (under a lens) above, paler and tomentulose especially upon the veins and veinlets beneath, 1 to 1.2 dm. long, 4 to 5 cm. broad, attenuate to a caudate apex, rounded and deeply cordate at the base, the sinus narrow: inflorescences rounded-corymbose, together forming a large leafy oval or subpyramidal panicle; its branchlets, slender pedicels, and filiform bracts brown-pubescent; heads very numerous, 4 to 5 mm. long, about 10-flowered; involucreal scales linear, attenuate, subequal, 3 mm. long, covered with jointed purple hairs and resinous lucid atoms: corolla scarcely 2 mm. long, gradually contracted toward the base, nearly equalled by the simple white pappus: achene dark, minutely pubescent, 1.5 mm. long. — Collected by C. G. Pringle in Tamasopo Cañon, San Luis Potosi, Mexico, 28 November, 1890, no. 3372. This number was distributed as *E. Palmeri*, Gray, to which it is obviously related. It differs, however, both in the nature of its indument and the form of the leaves. The latter are rounded at the base in *E. Palmeri* while in *E. longifolium* they are deeply cordate. *E. filicaule*, Sch. Bip., is also a nearly related species, but its heads are conspicuously racemose, which is not the case here.

EUPATORIUM LUCIDUM, Ort. Hort. Matr. Dec. 35 (1797). An examination of authentic material of this briefly characterized species shows that it is just the plant to which I have recently assigned the name *E. capnoresbium*, Proc. Am. Acad. xxxv. 331, a name which must accordingly sink into synonymy.

Eupatorium Luxii. Apparently shrubby: branches subterete, striate, covered with a fine spreading and very dark pubescence: leaves opposite, elliptic-ovate (the upper ovate-lanceolate), acute to acuminate at each end, pinnately nerved, 6 to 13 cm. long, half as broad, serrate,

sparingly pubescent when young, quite glabrate except on the nerves and somewhat lucid in age, nigrescent in drying, the teeth salient, mucronulate; petioles 1.8 to 3 cm. long: heads medium-sized, about 25-flowered, 8 to 10 mm. long, in an opposite-branched corymbose panicle; involucreal scales 3-4-seriate, ovate to lanceolate, acuminate, closely imbricated externally, nigrescent at the tip, pale at the base, ciliolate, silvery and lucid on the smooth inner surface: corolla-tube 5 to 6 mm. long, glabrous, gradually narrowed from the summit to the base, the teeth very short, sparingly pubescent: achenes 2 mm. long, dark, glabrous, lucid, the angles very prominent; pappus rather copious, white, nearly equalling the corolla. — Collected by Heyde and Lux at Nebaj, Depart. Quiché, Guatemala, altitude 2,150 m., April, 1892, being no. 3387 of Mr. John Donnell Smith's sets of Central American plants, and having been distributed as *E. Tuerckheimii*, Klatt, a species with much narrower leaves and linear-oblong involucreal scales, glabrous stem, etc., well shown by no. 77 of Mr. John Donnell Smith's sets.

Eupatorium lyratum, Coulter, Bot. Gaz. xvi. 96 (1891), is *Conyza lyrata*, HBK.

Eupatorium Mariarum. Herbaceous; stems terete, weak, pithy, obscurely pulverulent-pubescent and also covered with scattered spreading white trichomes; branches ascending: leaves opposite, long-petioled, deltoid, acute, coarsely crenate except at the abruptly contracted base, thin, deep green and bearing a few scattered white trichomes above, somewhat paler and essentially glabrous beneath, 3-nerved from the slightly acuminate point of attachment, 5 to 7 cm. long, 4 to 5 cm. broad; petioles weak, flexuous, 3 to 5 cm. long, with a double pubescence as on the stem: heads about 25-flowered, in small axillary and terminal corymbs, pedicellate; bractlets acute, lance-linear to filiform; involucreal scales linear-oblong, acute, subequal, thin, mostly 2-nerved, green, 3 mm. long: corolla (probably white) glabrous, with a slender proper tube exceeding a much broader well-marked throat and spreading limb: achenes dark-brown, slightly spindle-formed, hispidulous toward the summit. — Collected by E. W. Nelson on Maria Madre Island of the Tres Marias Group, May, 1897, no. 4244. At first taken for *E. pazcuarensis*, HBK., but clearly distinct by its long petioles, different leaf-contour and dentation, also in its pubescence.

Eupatorium pachypodum. Caudex thickish, lignescent, branched; stems annual, one to several, erect, simple to the inflorescence, 3 to 4 dm. high, terete, cinereous-tomentulose: leaves opposite, small, much exceeded by the internodes, ovate to suborbicular, acute, rounded at the

essentially sessile base, serrate, 1.3 to 1.8 cm. long, nearly as broad, green and sparingly pubescent above, covered beneath by a short soft ashy more or less deciduous pubescence, and bearing upon both surfaces golden resinous particles: panicle flat-topped, its slender ascending branches and pedicels (7 to 9 mm. long) grayish-tomentulose; bractlets linear to filiform; heads about 12-flowered, 7 mm. long; involueral scales subequal, oblong, soft-pubescent and pale green upon the outer surface, 3 to 4 mm. long, obtuse: corollas white or at least pale, 4 mm. long, with slender tube somewhat exceeded by the gradually amplified throat, glabrous: achenes 2 lines long, hispid on the angles, pappus white, equalling the corolla. — Collected by C. G. Pringle on rocky hills near Guadalajara, Jalisco, 26 May, 1891, no. 3718. Distributed as *E. scordonioides*? a species with shrubby perennial stems, deltoid-peltate leaves, etc.

Eupatorium pansamalense. Stem glabrous, rather strongly angled, striate, pithy: leaves opposite or ternate, slender-petioled, rhombic-ovate, caudate-acuminate, acute at the base, mucronate-serrate, thin, pinnately nerved, deep green and nearly glabrous except on the midnerve above, paler and puberulent or tomentulose upon the nerves and veins beneath, 1 to 1.3 dm. long, half as broad; petioles 2 to 3 cm. long: branches of the inflorescence and filiform pedicels fuscous-tomentulose; heads about 35-flowered, very numerous in a round corymbose panicle; scales of the involucre in about 3 series, narrowly oblong, acute to acutish, in a dried state stramineous except a central dark brown streak, the more or less narrowed tips thin, erose: corollas slender, without definitely marked throat, glabrous except near the limb: pappus white, equalling the corolla; achenes very small, scarcely 1.4 mm. long, glabrous. — *E. Tuerckheimii*, Coulter, Bot. Gaz. xvi. 97 and in J. D. Smith, Enum. Pl. Guat. ii. 95, as to no. 1342, not Klatt. — Collected by H. von Tuerckheim at Pansamalá, Depart. Alta Vera Paz, Guatemala, altitude 1,170 m., April, 1888, no. 1342 of Mr. John Donnell Smith's sets. *E. Tuerckheimii*, Klatt, differs in having much narrower oblong-lanceolate subcoriaceous short-petioled leaves which are quite glabrous upon both sides, paler beneath, and marked by a fine transverse venulation.

Eupatorium pinabetense. Shrub with angled and striate glabrous branches: leaves opposite, lance-oblong, acuminate at each end, mucronulate-serrate, smooth, green and glabrous upon both surfaces, 1 to 1.5 dm. long, 2 to 3 cm. broad, pinnately veined from a strong midnerve: smaller branches of the rather dense thyrsoid panicle fuscous-

tomentulose under a lens; heads numerous, crowded, small, about 10-flowered, short-pedicelled; scales of the involucre very few, unequal, elliptical, rounded at the apex, glabrous but erose-ciliate, in a dried state brown: corolla glabrous or nearly so even at the limb, without clearly marked throat, equalled by the white pappus: achenes (young) pale, glabrous, 1.8 mm. long. — Collected by E. W. Nelson near Pinabete, Chiapas, Mexico, 8 February, 1896, no. 3785. This species is near but clearly distinct from *E. daleoides*, Hemsl. and *E. tepicanum*, Hemsl.

Eupatorium pleianthum. Doubtless perennial: stem slender, terete, scabrous-puberulent, finely striate, reddish brown, loosely few-branched above: leaves opposite, ovate, essentially sessile, thickish, reticulate-veiny, coarsely few-toothed, acute, cordate, 3-nerved, 2.5 to 3.5 cm. long, two-thirds as broad, slightly scabrous upon both surfaces, covered below by bright resinous globules: heads large, 2 cm. in diameter, slender-pedicelled, erect; involucre scales imbricated in 3 or 4 rows, oval to oblong, rounded at the apex, thin, glabrous and glutinous, striate, pale green, scarcely herbaceous: corollas 6 mm. long, gradually narrowed from the summit to the base, about equalled by the copious stiffish tawny pappus: styles very long and conspicuous, clavate; achenes 5 to 6 mm. in length tapering toward the base, reddish brown, covered with resinous globules, not transversely striate. — *E. adenospermum*, var. *pleianthum*, Gray, Proc. Am. Acad. xv. 26. — Collected by Dr. Berthold Seemann, Western Mexico. Type in herb. Gray. While sharing many characters with *E. adenospermum*, Sch. Bip., this plant differs so markedly in its opposite (not alternate), shorter, ovate not oblong leaves of differing dentation that intergradation seems very unlikely.

Eupatorium prionobium. Branches ascending, terete, green, striate, puberulent: leaves opposite, petiolate, deltoid, ovate to ovate-oblong, cordate with open sinus and hastate tendency, acutish to rounded at the apex, crenate or crenate-serrate, thickish, bright green but covered with short scattered white hairs upon both surfaces, scarcely paler beneath, 2 to 4 cm. long, 1.7 to 2.5 cm. broad; petiole puberulent, 6 mm. long, sulcate upon the upper side: heads small, about 20-flowered, in round-topped sessile cinereous-puberulent corymbs; pedicels 3 to 5 mm. long; bractlets subulate; involucre green, the scales lance-oblong, acute, subequal, loosely imbricated, 2.5 mm. long, scarcely half the length of the flowers: corolla in dried specimen white, 3 mm. long, with a relatively long throat narrowed into a shorter tube, glabrous, equalled by the bristles of the pappus; these somewhat unequal, barbellate, white

but the barbules upon the lower half tipped with deep purple or violet: achenes 1.8 mm. long, upwardly hispid on the angles. — Collected by E. W. Nelson on the Sierra Madre, State of Chihuahua, Mexico, 29 September, 1899, no. 6499. Type in herb. Gray and herb. U. S. Nat. Museum. Related to *E. ageratifolium*, DC., and *E. occidentale*, Hook.

Eupatorium prionophyllum. Tree; appearing glabrous to the unassisted vision, but covered upon the branchlets, petioles, veins of the leaves, and pedicels by traces of a short close fuscous tomentum; branches curved; cortex gray: leaves opposite, slender-petioled, broadly ovate, conspicuously acuminate, usually obtuse at the base, incisely and often somewhat doubly serrate-dentate nearly from the base to the apex, thin, green on both surfaces, pinnately veined, 7.5 to 9 cm. long, two-thirds as broad; the teeth acuminate, incurved; petioles 1 to 4 cm. long: heads 25–30-flowered, in terminal opposite-branched rounded at first thyrsoid at length more open panicles; bractlets filiform; scales of the involucre imbricated in about 3 series, the outer short and ovate, acute, mucronate with a glandular tip, the inner oblong, obtusish, all striate, fimbriate-ciliolate, externally stramineous becoming purplish or fuscous in age especially near the tip, silvery and lucid within: corolla glabrous, gradually narrowed from the summit to the base: pappus white, barbellate, moderately copious, nearly equalling the corolla: achenes at maturity dark brown, glabrous, lucid. — *E. ixiocladon*, Klatt, Bull. Soc. Bot. Belg. xxxi. 190, not Benth. — Collected by Prof. H. Pittier on the banks of the river Poros, no. 1705 (type in herb. Gray) and near the Rancho Flores, no. 1900, Costa Rica. This species has no close affinity with *E. ixiocladon*, Benth., a plant well shown by Mr. J. D. Smith's no. 7501.

EUPATORIUM QUADRANGULARE, DC. Prodr. v. 150 (1836). Of this, *E. thyrsoides*, Moc., notwithstanding its supposed terete stems, is certainly a synonym. Nothing beyond the younger branchlets of *E. thyrsoides* appears to be known, while even in the square-stemmed *E. quadrangulare* these younger branches are often subterete.

Eupatorium viscidipes. Stem slender, terete, dark-purple, minutely glandular and very viscid; branches opposite, spreading, curved upward: leaves opposite, deltoid-ovate, caudate-acuminate, crenate-serrate in the middle, 3-nerved from the obtuse or subtruncate base, 2.2 to 3.5 cm. long, 1.3 to 2.5 cm. broad, minutely puberulent above, slightly paler and punctate beneath with translucent dots; petioles 1.2 to 1.7 cm. long: heads rather numerous, small, 6 mm. in diameter, about 18-flowered, borne in a large loose corymbose leafy-bracted panicle; pedicels filiform, 3 to

13 mm. long, glandular and very viscid, covered with extraneous particles; involucre turbinate-campanulate; the scales very unequal, much imbricated, pluriseriate, the outer ovate-oblong, the inner oblong, subscariosus, striate, all obtuse or rounded at the apex, glabrous or slightly glandular, viscid: corolla glabrous, white, 2.3 mm. long; the proper tube short, much exceeded by the scarcely enlarged cylindric throat: achenes nearly black, columnar, hispidulous on and between the angles; pappus bright white, a little shorter than the corolla. — *E. pycnocephalum*, Coult. in J. Donnell Smith, Enum. Pl. Guat. iv. 75 (1895), as to no. 3397, not Less. — Collected by Heyde & Lux at Chicamán, Department Quiché, Guatemala, altitude 1,230 m., April, 1892, no. 3397 of Mr. J. Donnell Smith's Guatemalan sets. Type in herb. Gray. To be distinguished from *E. pycnocephalum*, Less. by its viscosity, quite different and much more imbricated involucre, etc., and from *E. anisopodum*, described above, by its viscosity, different leaf-form, rounded instead of acute or acuminate involucre scales, etc.

***Brickellia amblyolepis*.** Stem large, fistulose, 2 to 2.5 m. high, glabrous, purple mottled with green: leaves whorled below, opposite above, alternate in the upper parts of the open inflorescence, ovate, acuminate, 3-ribbed from the cuneate entire base, coarsely serrate from below the middle to the acuminate apex, green and glabrous above, paler and finely pubescent upon the veins beneath, 7 to 13 cm. long, half as broad; petioles 1.3 to 3.4 cm. long: heads rather large, broader than high, nodding in an open leafy panicle; pedicels bearing a few linear to spatulate bractlets; scales of the involucre in 3 to 4 series, spatulate-oblong, rounded at the apex, green and nearly glabrous except upon the deep purple tomentulose margin: corollas greenish, 5 mm. long, glabrous, nearly equalled by the rather copious purple-tinged pappus: achenes (immature) 5 mm. long, minutely pubescent; styles strongly clavate, bright orange turning to brown. — Collected by C. G. Pringle on mountains above Iguala, Guerrero, Mexico, 4 October, 1900, no. 8415. A stately species 2 to 3 metres high, not very closely related to any hitherto described. Type in herb. Gray.

***Brickellia cardiophylla*.** Herbaceous; stem terete, glandular-pubescent; branches opposite, widely spreading: leaves ovate-triangular, acute or obtusish, entire or nearly so, broadly cordate at the base, membranaceous, 3-nerved, minutely glandular-puberulent, green upon both surfaces, scarcely paler beneath, 5 to 6 cm. long, nearly as broad; petioles slender, 2 to 3 cm. long: heads subumbellate near the ends of the branches, campanulate, 1 to 1.5 cm. in diameter; pedicels filiform, gland-

ular-puberulent, 2 to 3 cm. long, naked or bearing a single minute lanceolate bract; involucre scales appressed, imbricated in about 5 series, from ovate to linear obtusish, striate, the outer herbaceous-tipped, the inner often purplish; achenes columnar, 2.5 mm. long, minutely roughened or hispid; pappus bright white, not copious, 7 mm. in length: corollas in a dried state cream-colored. — Collected by C. G. Pringle in a barranca near Guadalajara, Jalisco, 1 May, 1894, no. 5885a. Type in herb. Gray. Near *B. floribunda*, Gray, but heads fewer and considerably larger: leaves subentire and of different contour.

Brickellia hebecarpoides. Erect herb, seemingly perennial but root not seen; stem straight, terete, striate, glandular-pubescent, copiously branched above: leaves opposite (the upper with a slight tendency to be alternate), ovate to ovate-oblong, acute or obtuse, membranaceous, finely and regularly serrate (the rameal entire or nearly so), rounded or abruptly acuminate at the 3-5-nerved often oblique base to the slender petiole, puberulent above, glandular-puberulent beneath, both surfaces green, the lower scarcely paler; branches slender, spreading, leafy: peduncles solitary in or usually a little above the forks of the branches, 1 to 2.5 cm. long, filiform, ascending or erect, glandular-pubescent, bractless; involucre 1.2 cm. long, campanulate, its outer bracts lance-oblong, acute, glandular-puberulent, herbaceous or at least herbaceous-tipped, half to two thirds the length of the lance-linear attenuate striate often purplish inner bracts; flowers about 30: corolla 1.3 cm. long, slender, glabrous, purple-tinged at least near the limb: achenes short, only 2 mm. in length, minutely pubescent; style-branches orange, strongly clavate. — Collected by C. G. Pringle in a barranca near Cuernavaca, State of Morelos, Mexico, altitude 1,540 m., 24 June, 1896, no. 7332. Type in herb. Gray. This species is related to *B. hebecarpa*, Gray, but differs in its scarcely pubescent achenes and much longer outer involucre scales, as well as in other ways.

Brickellia petrophila. Compact shrub, 3 to 6 dm. high; stems branched from near the base; branches curved-ascending, becoming erect, gray or lightish brown, covered with a fine spreading pubescence consisting of minute gland-tipped hairs and longer non-glandular hairs, the latter readily distinguishable to the unassisted vision: leaves opposite, small, reniform, ovate, crenate, obtuse, broadly and shallowly cordate at the base, 7 to 10 (rarely 28) mm. long, 1 to 3 cm. broad, somewhat rugose above, finely pubescent or even tomentulose upon both surfaces, but scarcely or not at all canescent: heads subsessile, terminal on short or more elongated branchlets either forming a cylindric racemiform or a

broad and more pyramidal inflorescence, the two forms occurring upon the same individual; involucre cylindric or in a dried state narrowly campanulate, the scales stramineous, striate, imbricated in about four very unequal series, the outer ovate, obtuse, pubescent or at least ciliate, the inner oblong-linear, acute, about 8 mm. long; flowers about 20: achenes columnar, 3 mm. long, olive brown, slightly hispid on the ribs. — Collected by C. G. Pringle on rocky hills near the city of Chihuahua, 13 October, 1885, no. 610 (type, in herb. Gray). To this species I would refer the following specimens: from San Luis Potosi, *Schaffner*, no. 365, *Parry & Palmer*, no. 351; from Guanajuato, *Dugès*, no. 449; from Zacatecas, *Deam*, no. 140; from Durango, *Palmer*, no. 753. This species is nearly related to and has been generally confused with the more southern *B. veronicaefolia*, Gray, a species which is readily distinguishable by the extremely fine canescent non-glandular pubescence of its branchlets, in which the individual hairs cannot be seen without the use of a strong lens. The involucre scales of *B. veronicaefolia* are more closely imbricated and in more numerous rows.

Var. umbratilis. Heads larger, 1.5 cm. in diameter, terminal upon more elongated branches. — Collected by Dr. Edward Palmer in a shady ravine at Parras, Coahuila, October, 1898, no. 438, and also a solitary individual in a ravine at Mapimi, Durango, no. 521.

Brickellia vernicosa. Shrub with striate buff or at length gray cortex and erect scabrous-puberulent branches: leaves alternate, ovate, serrate, acutish, bright green, coriaceous, veiny, subsessile, minutely hispidulous, glandular-punctate beneath, often vernicose, 1 to 1.7 cm. long: inflorescences cylindric thyrses 1 to 1.5 dm. long; bracts leaf-like but very small; heads subsessile, 1.2 cm. long, on short branches; involucre scales about 4-seriate, varying from ovate to linear-oblong, obtuse, minutely granular, striate: slender corollas 7 to 8 mm. long, the upper half violet: achenes slender, columnar, light-colored, 4 mm. long, upwardly hispid; pappus copious, 6 mm. long; styles yellow, only moderately clavate. — Collected by Dr. Edward Palmer at Santiago Papasquiaro, Durango, "April and August," 1896, no. 57. Related to *B. baccharidea*, Gray, but readily distinguished by its much longer achenes, etc.

MONTANO A ARBORESCENS, Sch. Bip. (*Montagnaea arborescens*, DC. Prodr. v. 565). An examination of the type shows that the tips of the pales are recurved as in most of the other species of this genus and not inflexed as unfortunately described in the original characterization. The leaves are oblong-lanceolate, attenuate at each end, rather sharply

and regularly serrate near the middle and relatively narrower than in the nearly related *M. frutescens*, Hemsl. I am unable to find *M. arborescens* represented in any of the many recent Mexican collections.

Calea Pringlei. Stems terete, 6 to 9 dm. high, in dried state striate, dull brown, covered with a fine spreading or slightly reflexed tomentum of sordid color, and on young parts somewhat glandular; branches opposite: leaves broadly ovate to nearly orbicular, sessile, acute, coarsely dentate (1 to 1½ teeth to the centimeter), rugose and scabrous-puberulent above, paler green, reticulate veiny, and covered with a fine white crisped pubescence beneath: heads 8 mm. long, 3 mm. in diameter, about 10-flowered, borne on pedicels 2 to 5 mm. long in opposite-branched compound umbelliform cymes; scales of the cylindrical involucre pale yellow, striate, very unequal, rounded at the tip, the outer sparingly pubescent, small, not foliaceous nor even herbaceous; pales erose, nearly or quite glabrous: corolla nearly glabrous but covered with transparent globules, the proper tube slender and somewhat contracted to the summit where it suddenly expands into the very short throat and deeply cleft limb of five linear segments: achenes slender, somewhat attenuate toward the base, dark-colored with a violet tinge, appressed-pubescent; pappus scales about 1 mm. long, also purple-tinged. — Collected by C. G. Pringle on mountains above Iguala, Guerrero, Mexico, altitude 1,230 m., 24 October, 1900, no. 8373. Type in herb. Gray.

CALEA ZACATECHICHI, Schlecht., var. *calyculata*. Involucre subtended at the base by 2 or 3 herbaceous-tipped bracts; these usually shorter than but sometimes exceeding the inner scarious scales. — Mexico, Nuevo Leon in the Sierre Madre near Monterey, *C. G. Pringle*, no. 2224, 16 July, 1888; also in the same locality, *C. & E. Seler*, no. 1080, 12 October, 1895.